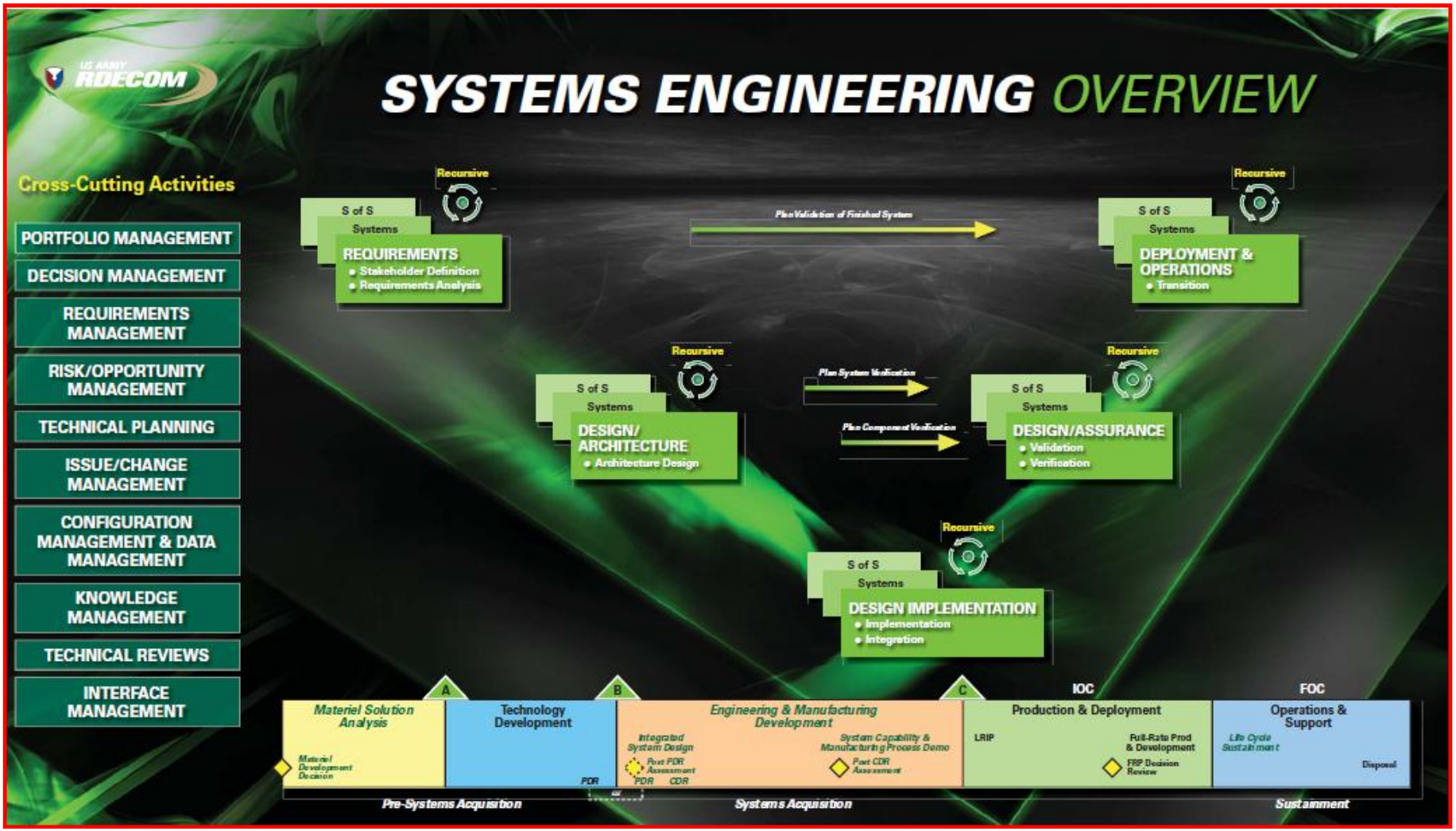
Interactive Reference Guide (IRG)
Home Page



Report Documentation Page

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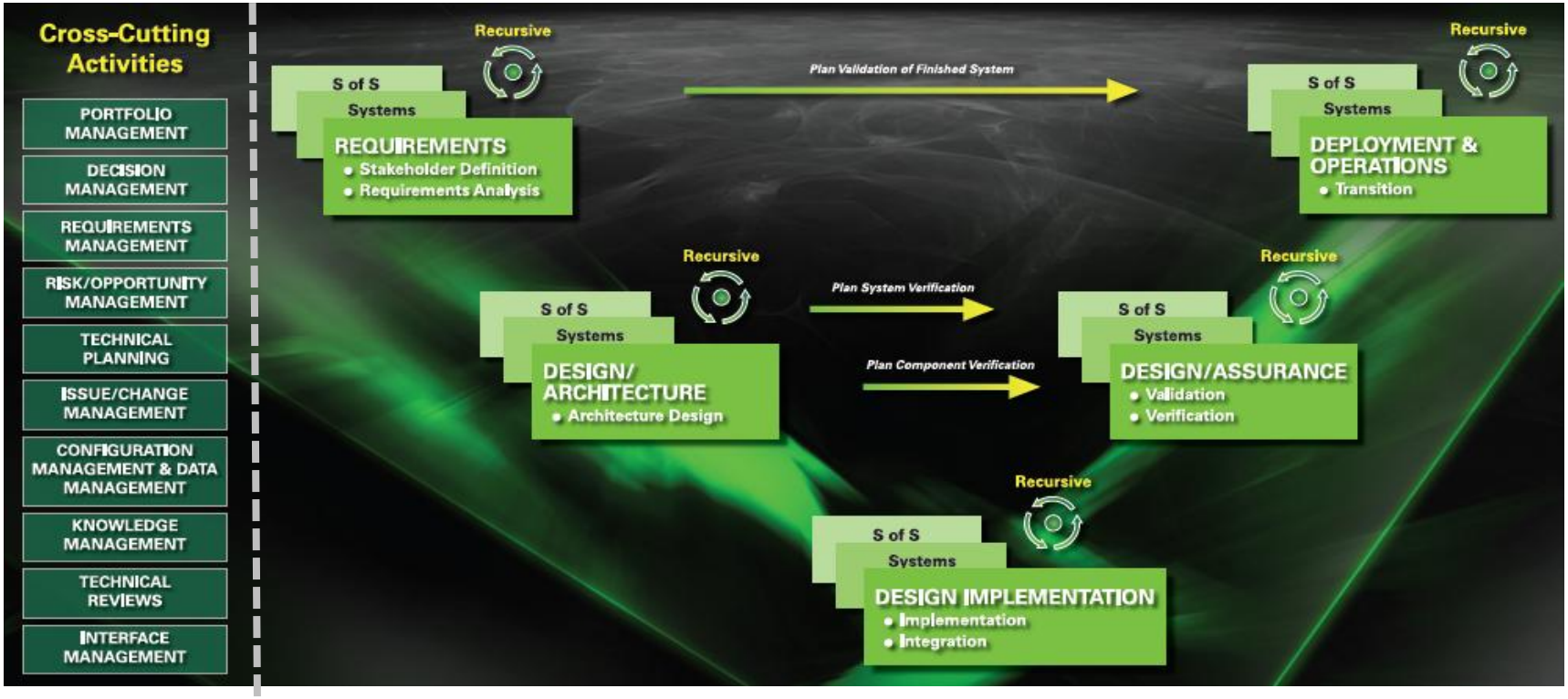
The TARDEC Systems Engineering Lean Process Model

The TARDEC Systems Engineering Lean Process Model is a synthesized version of the DAU SE Process model.



10 Cross Cutting Activities

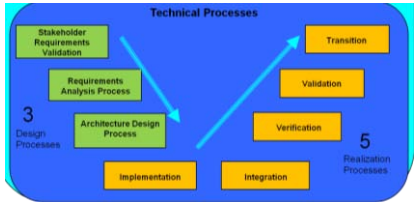
5 Technical Processes

2 Design Processes (Top-Down Design)

3 Realization Processes (Bottom-Up Realization)

Technical Processes Mapping

DAU Process model mapped to TARDEC Lean Process model
8 DAU Technical Processes synthesized into 5 TARDEC Technical Processes



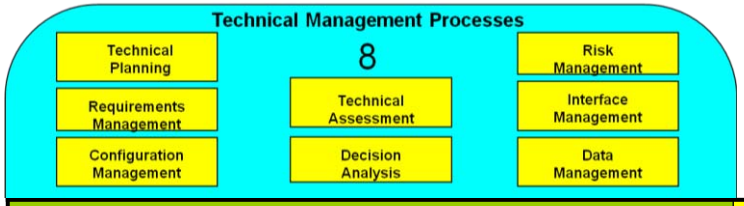
TARDEC SE Lean process model Derived from DAU SE Process model

1. Stakeholder Requirements Validation
2. Requirements Analysis Process
3. Architecture Design Process
4. Implementation
5. Integration
6. Verification
7. Validation
8. Transition

Technical Management Processes Mapping

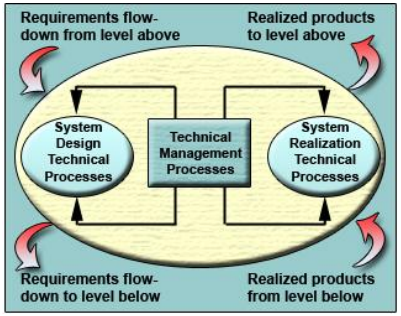
DAU Process model mapped to TARDEC Lean Process model

8 DAU Technical Management Processes synthesized into 10 TARDEC Cross-Cutting Activities

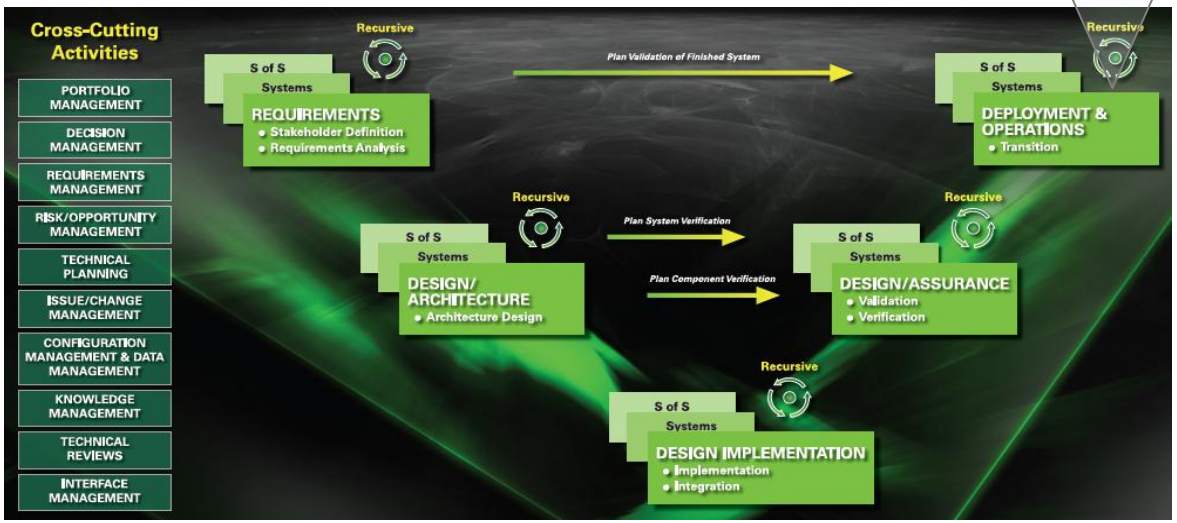


DAU Technical Management Process	TARDEC Cross-Cutting Activities
Technical Planning	Technical Planning
Requirements Management	Requirements Management
Configuration Management	*Configuration & Data Management*
Technical Assessment	*Technical Reviews*
Decision Analysis	*Decision Management*
Risk Management	*Risk /Opportunity Management*
Interface Management	Interface Management
Data Management	*Combined under Configuration Management*
	Portfolio Management
	Knowledge Management
	Issue/Change Management

Systems Engineering Process Interactions



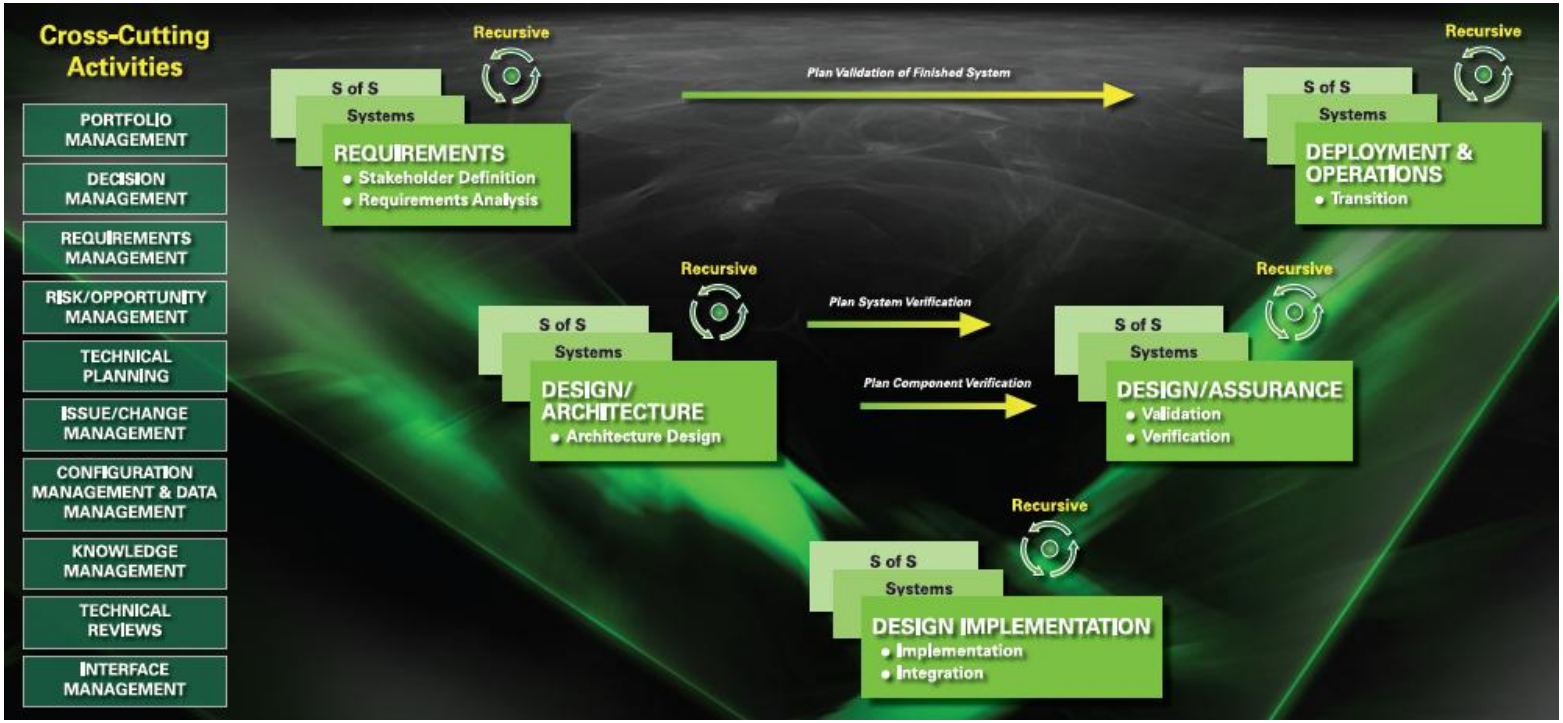
A way of depicting the interactions among Technical Processes and their controlling Technical Management Processes is shown here as the 'Systems Engineering Engine'.



Technical Processes get applied ***recursively*** to each system element, from the ***top to the bottom***. This continues until the lowest system products are defined to the point where they can be ***implemented*** (i.e., bought, built or reused) ***and realized.***

Meanwhile, Technical Management Processes are controlling all these Technical Processes and ***ensuring their effective application***.

Systems Engineering Processes Map to TARGET



OPORD Mandated Technical Reviews

TARGET Process

Systems Engineering Activities

SRR PDR CDR TRR

Ideation & Scoping — Gate 1 — **Concepts & Feasiblity** — Gate 2 — **Design & Development** — Gate 3 — **Validation** — Gate 4 — **Technology Transition** — Gate 5

- Identify Customers & Stakeholders
- Initial Risk Assessment
- Technology Analysis (Landscape)
- Initial Project Plan Framework

- Validate Customer Requirements
- Technology Readiness Assessment
- Technology Maturity Assessment
- Analysis of Alternatives/Notional Solutions Analysis
- Risk Management Plan
- Develop Project Plan
- Requirements Management Plan

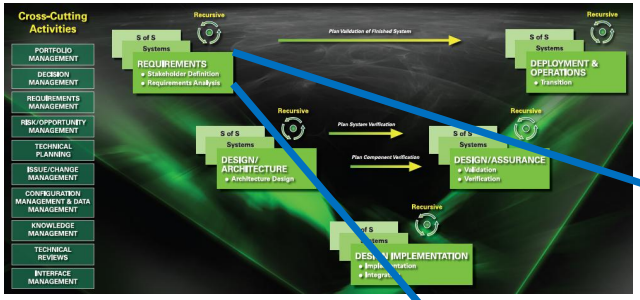
- Complete System Engineering Technical Reviews
- Initial Demonstration of Technical Performance against Requirements

- Validate Performance with Customer
- Demonstrate Technology Robustness

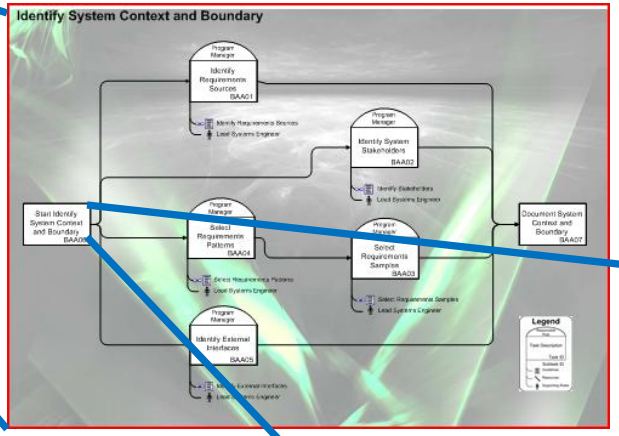
- Finalized Design
- Finalized Transition Data Package
- Finalized Requirements Traceability Matrix
- Finalized System Architecture with Interfaces

IRG Content: Technical Processes Drill Down to Process Flows and Further Down to IDEF Diagrams with Descriptions

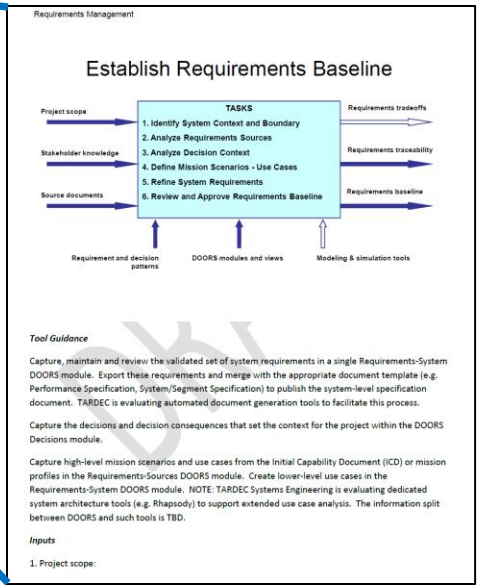
IRG Home Page



Process Flows (Requirements example)



Process Attachment:
- IDEF Diagram
- Process Descriptions


Requirements Management

Establish Requirements Baseline

Tool Guidance

Capture, maintain and review the validated set of system requirements in a single Requirements-System DOORS module. Export these requirements and merge with the appropriate document template (e.g. Performance Specification, System/Segment Specification) to publish the system-level specification document. TARDEC is evaluating automated document generation tools to facilitate this process.

Capture the decisions and decision consequences that set the context for the project within the DOORS Decisions module.

Capture high-level mission scenarios and use cases from the Initial Capability Document (ICD) or mission profiles in the Requirements-Sources DOORS module. Create lower-level use cases in the Requirements-System DOORS module. NOTE: TARDEC Systems Engineering is evaluating dedicated system architecture tools (e.g. Rhapsody) to support extended use case analysis. The information split between DOORS and such tools is TBD.

Inputs

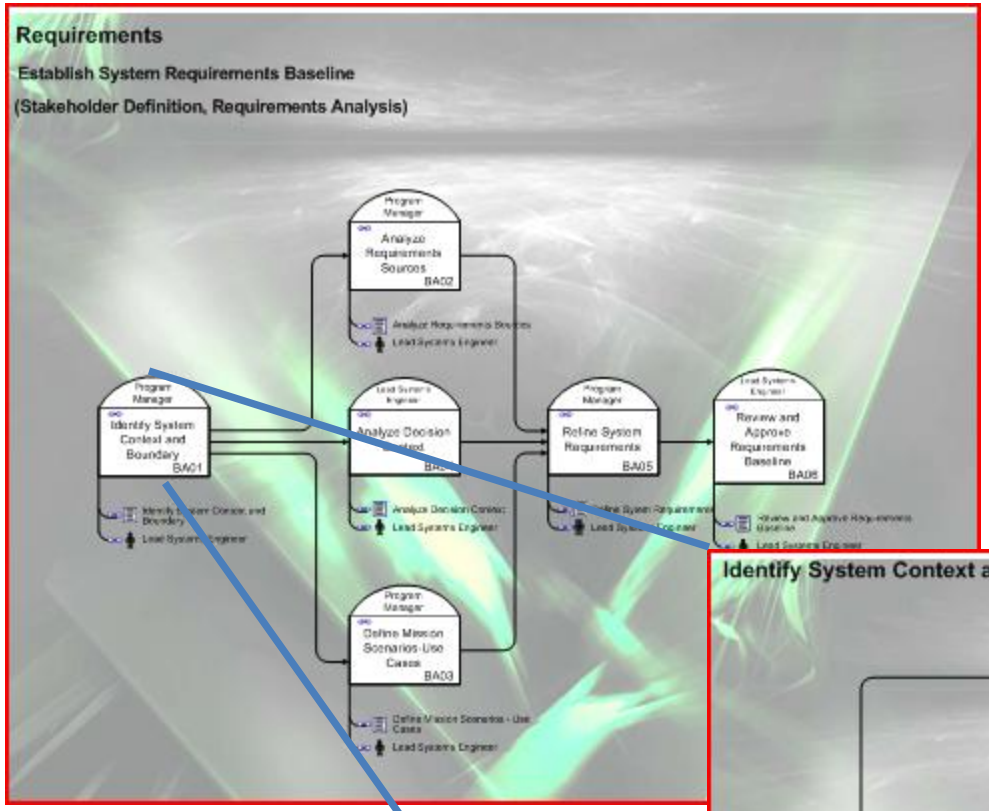
1. Project scope:

IRG content includes flow maps, and process attachments with standardized process descriptions:

Process Guidance:
Tool Guidance:
Inputs:
Mechanisms:
Tasks:
Outputs:
Documentation Guidance:
Review Guidance:
Role Guidance:
TARGET/CT Question Guidance
Example thread Guidance:

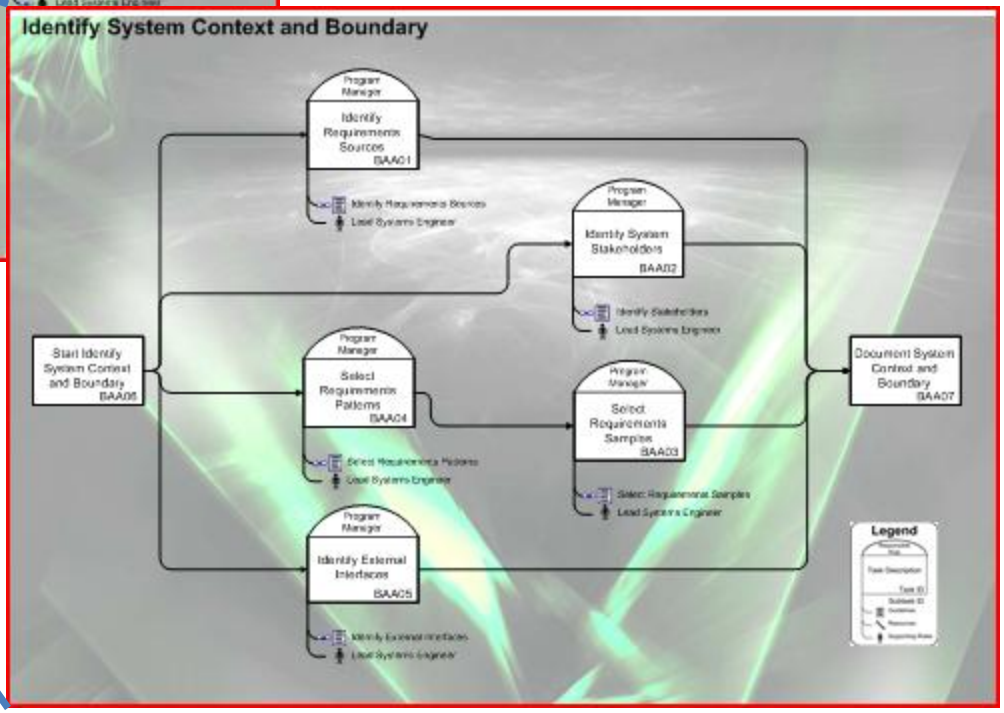
Additional attachments with relevant process material , such as training documents, will also be included.

Level 1 Process Flow – Requirements Example



Process Flows Also Have Sub Levels

Level 2 Process Flow – Identify System Context and Boundary Example



IDEF Diagrams: Contain Inputs to Process Elements Along with Process Tasks, Process Outputs and Mechanisms

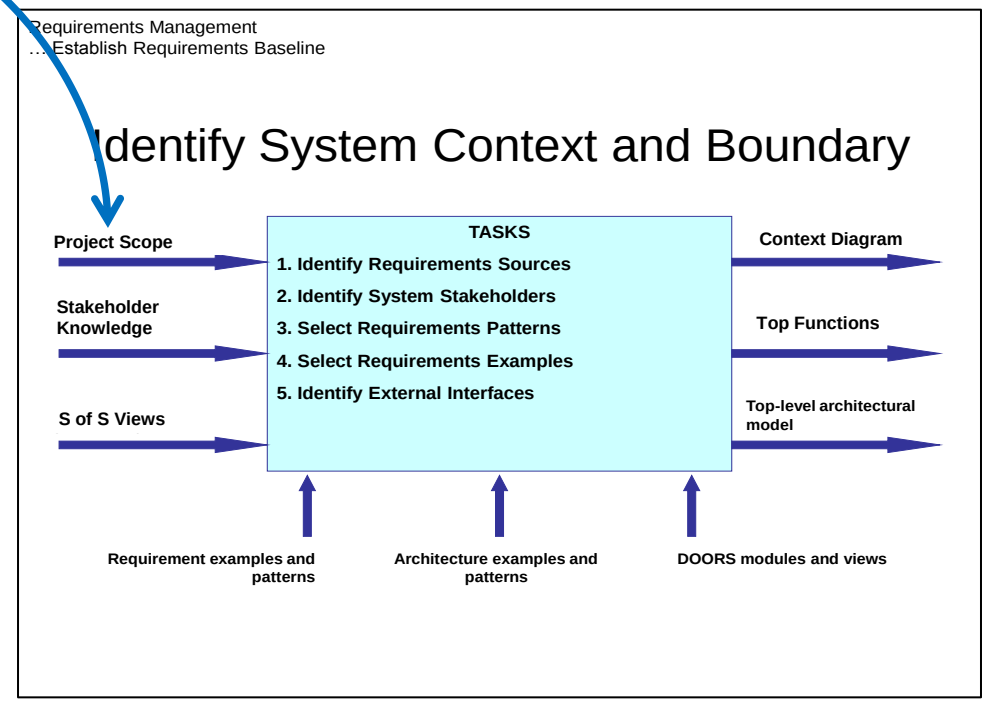
Process Inputs:

Project Scope: Project scope includes a clear statement of the problem to be solved.

Stakeholder Knowledge: Stakeholders are source of requirements and contextual information that is essential to fully understand the problem to be solved and to formally define success.

Systems of Systems Views: System of Systems views include graphical views or tables that provide context by illuminating where the system fits into a System of Systems or how the system interacts with legacy systems.

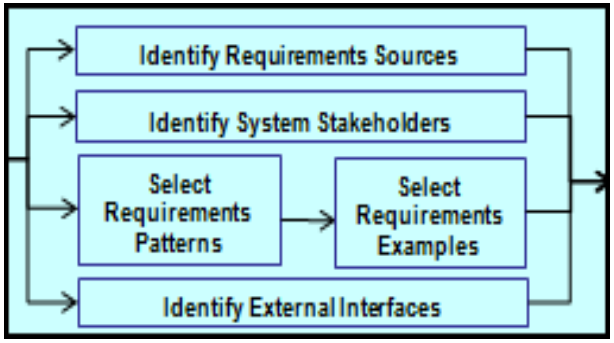
System Context Example



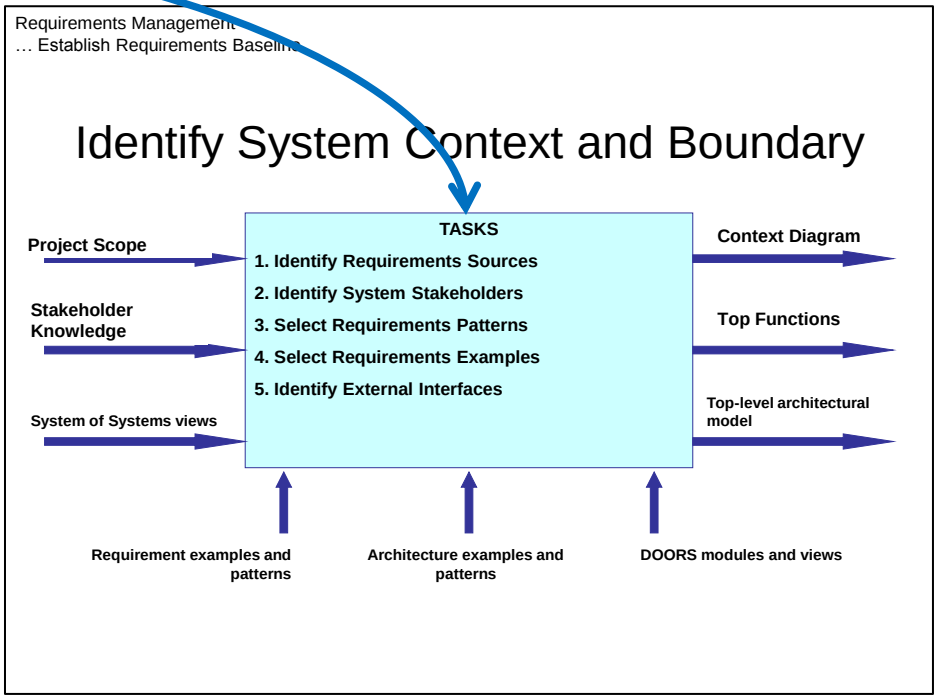
IDEF Diagrams: Contain Inputs to Process Elements Along with Process Tasks, Process Outputs and Mechanisms

Process Tasks:

Please note: tasks defined here are both iterative and do not necessarily follow a sequential order. The experience of the P-SEL effectively guides the project and the flow of task execution.



System Context Example



IDEF Diagrams: Contain Inputs to Process Elements Along with Process Tasks, Process Outputs and Mechanisms

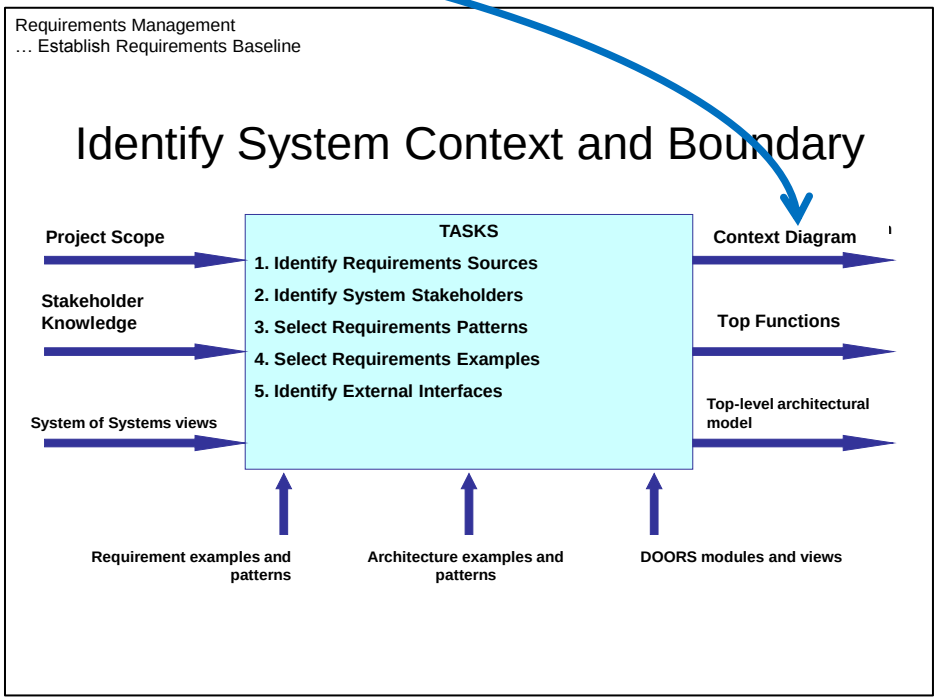
Process Outputs:

Context Diagram: At a minimum, a System Context Diagram identifies each interface with an external system. External interactions may be labeled by type: functional, control, data, mechanical, etc.
(example next page)

Top Functions: The top-level functional model of a system may be a simple 2 or 3 level hierarchical decomposition of the functions that a system must support.

Top level architecture model: The top-level architectural model of a system may be a simple 2 or 3 level hierarchical decomposition of the hardware/software subsystems, user tasks and data stores/elements that comprise the system.

System Context Example

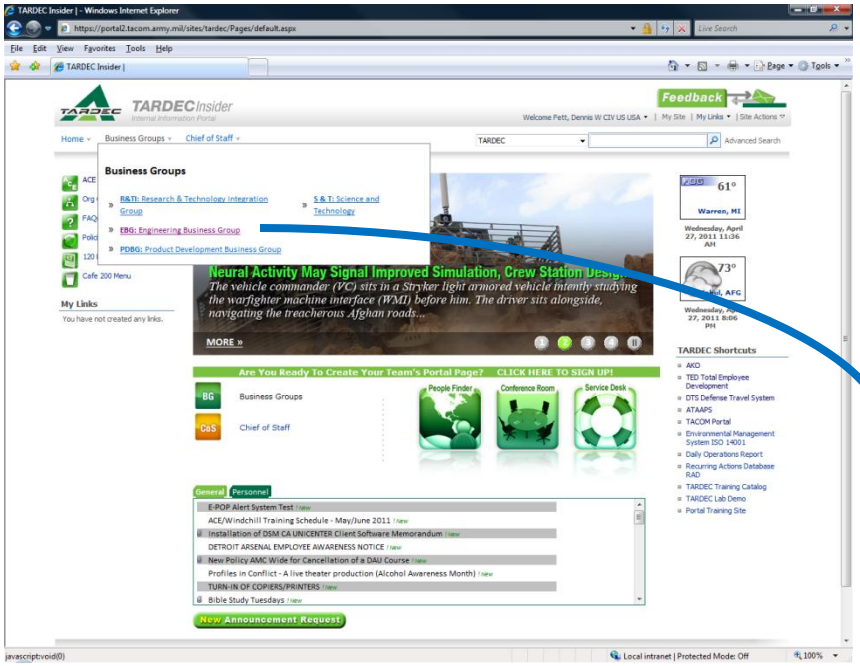


Process Guidance Descriptions: Are Included with Each Process Element and Address S&T as Well as Acquisition Program Use Case Scenarios

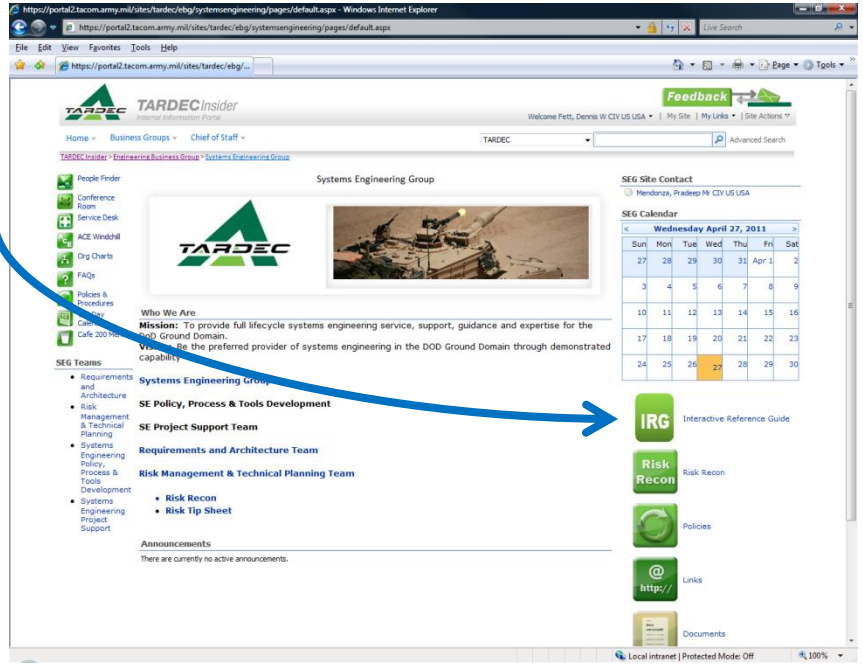
Process Guidance Type	IRG Process Content
Review Guidance	Explain how the outputs of this function will be used during a Technical Review event.
Role Guidance	Describe who in the organization (by role) is responsible for supporting this function.
Tool Guidance	Describe what SE tools, such as DOORS, are used to support this function.
Documentation Guidance	Describe how a knowledge pattern or document/report template should be used to support this function.
WBS Guidance	Explain how this process (and its children) should be mapped to a project WBS, i.e. translated into executable tasks.
Example Thread Guidance	Include diagrams, screen shots or textual descriptions of examples of this function being performed or its outputs.
TARGET/CT Question Guidance	Capture all relevant questions contained in the SE Capability Tool (CT) that relate to mapping this function to the TARGET development cycle.

IRG Portal Access

TARDEC Insider →EBG Link



EBG Link →IRG Link



References and Additional Guidance

Please contact the Systems Engineer assigned to your project for further guidance

Detailed Process information on the TARDEC Systems Engineering Process can be accessed from the Systems Engineering Homepage via the TARDEC Portal